DOCUMENT RESUME

ED 139 945 CE 010 963

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TITLE Masonry. Performance Objectives. Intermediate Course.
INSTITUTION Duval County School Board, Jacksonville, Fla.
PUB DATE May 75
NOTE 21p.; For a related document see CE 010 980

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Behavioral Objectives; *Bricklaying; Construction (Process); *Criterion Referenced Tests; Job Skills; *Masonry; Secondary Education; Shop Curriculum; Skill Development; Skilled Occupations; Trade and Industrial Education

ABSTRACT

Several intermediate performance objectives and corresponding criterion measures are listed for each of 13 terminal objectives for an intermediate masonry course. These materials, developed for a two-semester (3 hours daily) course, are designed to provide the student with the skills and knowledge necessary for entry level employment in the field of masonry. The following areas are covered under the terminal objectives: Hand process, estimating, layout application, modular coordination, blueprint reading, masonry materials, decorative stone, placing of reinforcing steel in footing, story pole, batter boards, and advanced masonry plus related and technical information. Titles of the terminal objectives sections are Orientation, Occupational Information, Occupational Safety, Blueprint Reading, Estimating, Laying Concrete Blocks, Concrete Finishing, Laying Glass Blocks, Modular Dimension, Story Pole and Gage Stick, Structural Bonds, Advanced Brick Laying, and Expansion Joints. (This manual and 54 others were developed for various secondary level vocational courses using the System Approach for Education (SAFE) guidelines.) (HD)

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MASONRY

INTERMEDIATE COURSE

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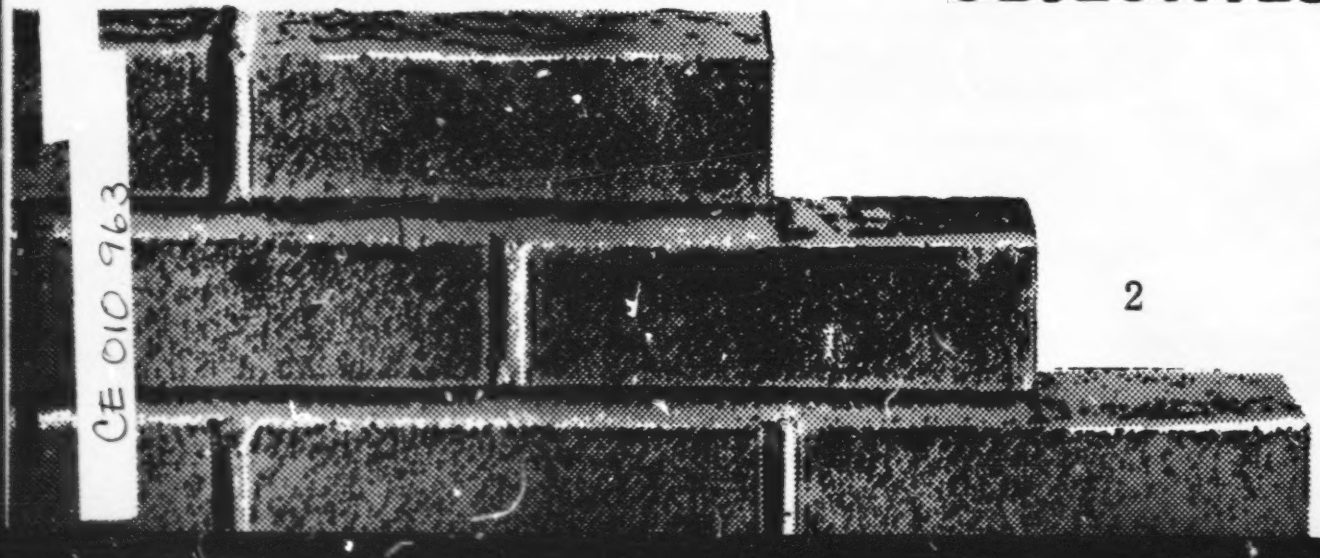

CE 010 963

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May 1975

ACKNOWLEDGEMENTS

This manual was developed using System Approach For Education (SAFE) guidelines.

Appreciation and recognition are extended to the following educators who have assisted in the preparation of this manual:

Mr. Ernest Taylor, Coordinator
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Mr. Joseph Killough, Coordinator
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Mr. Charles L. Downing, Supervisor
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The following educator participated as the writer of this manual:

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MASONRY - INTERMEDIATE

ACCREDITATION NO: 9133

LENGTH OF COURSE: 2 semesters

TIME BLOCK: 3 hours

COURSE DESCRIPTION

The intermediate masonry program is a one year 3 hours per day course designed to provide the student with the skills and knowledge necessary for entry level employment in the field of masonry.

This course includes the following:

Hand process, estimating, layout application, modular coordination, blue print reading, masonry materials, decorative stone, placing of reinforcing steel in footing, story pole, batter boards, and advanced masonry plus related and technical information. Time block, 3 hours daily for 180 days, 540 total hours.

MASONRY - INTERMEDIATE

ACCREDITATION NO: 9133

1.0 ORIENTATION

2.0 OCCUPATIONAL INFORMATION

3.0 OCCUPATIONAL SAFETY

4.0 BLUEPRINT READING

5.0 ESTIMATING

6.0 LAYING CONCRETE BLOCKS

7.0 CONCRETE FINISHING

8.0 LAYING GLASS BLOCKS

9.0 MODULAR DIMENSION

10.0 STORY POLE AND GAGE STICK

11.0 STRUCTURAL BONDS

12.0 ADVANCED BRICK LAYING

13.0 EXPANSION JOINTS

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 1.0 ORIENTATION

The learner will answer questions concerning student organizations; state the purpose of pre-stated performance objectives; and he will further state the conduct expected, the clean-up regulations, the grading procedure, and the items and attire required in class each day with 80% accuracy.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
1.1	The student, with 80% accuracy, will answer questions concerning student organizations available to industrial education students.	1.1	Answer the following questions: a. Name an outstanding club designed especially for industrial education students. b. What do the following letters mean? V _____ I _____ C _____ A _____ c. Can anyone belong to VICA? _____ d. Name the three advantages of VICA.
1.2	The student will state in writing the purpose of using pre-stated performance objectives.	1.2	Write the reason for the use of pre-stated performance objectives in this course.
1.3	The student will state in writing what conduct is expected of him in this shop.	1.3	State in writing the conduct expected of you in this class.
1.4	The student will state in writing the clean-up regulations used in this shop.	1.4	Write the clean-up regulations for this class.
1.5	The student will state in writing the grading procedure used in this course.	1.5	Write the grading procedure used in this course.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 2.0 OCCUPATIONAL INFORMATION

The student will demonstrate, with 75% accuracy, his knowledge of masonry occupational information by identifying related tasks, identifying sources of information concerning entry level jobs, will fill out a job application, will state the average wage for this trade and will define productivity.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
2.1	Given a list of tasks the student will correctly underline 9 of 10 performed by workers in the masonry trades.	2.1	Underline the tasks normally performed by the mason: a. Building construction b. Finishing concrete c. Floor tiling repair d. Stone masonry e. Cleaning marble f. Mixing concrete g. Terrazo construction h. Hanging dry wall i. Stuccoing walls
2.2	The student will list orally or in writing 2 sources of information concerning entry jobs in this trade.	2.2	List 2 sources of job entry information in the masonry field.
2.3	Given a typical job application tne student will complete it unassisted with 80% accuracy.	2.3	Fill out job application attached.
2.4	The student will state orally or in writing the wage scale of each of the following: a. Beginning apprentice mason b. Second year apprentice mason c. Journeyman mason	2.4	State the hourly wage of the following: a. Beginning apprentice mason b. Second year apprentice mason c. Journeyman mason
2.5	The student will, in writing, define productivity and explain its importance to the contractor.	2.5	Define productivity in writing and explain its importance to the contractor.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 3.0 OCCUPATIONAL SAFETY

The student will demonstrate his knowledge of occupational and personal safety in the masonry field by achieving 75% on a written examination.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
3.1	The student will list 5 safety rules pertaining to the masonry field.	3.1	Write 5 safety rules pertaining to the masonry field.
3.2	The student will list a minimum of 4 hazards involved in the brick laying occupation with 75% accuracy.	3.2	List at least 4 hazards involved in the brick laying occupation: 1. _____ 2. _____ 3. _____ 4. _____
3.3	The student will identify from a list of clothing, those which are considered safety wearing apparell with 75% accuracy.	3.3	Circle items which should be worn in shop: 1. Thick sole boots 2. Hard hat 3. Dust mask 4. Steel toe shoes 5. Flare bottom trousers 6. Safety goggles 7. Cloth gloves 8. Wool socks

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 4.0 BLUEPRINT READING

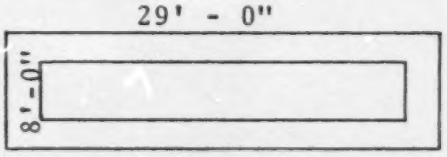
The student will pass a unit test on blueprint reading and trade drafting with a grade of 75% or better.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
4.1	Given a commercial building blueprint, the student will read it and fill out a given check list with an accuracy of 75%.	4.1	Read assigned blueprint and record the following scale used: Type of wall construction _____ Outside dimensions _____ Type of windows _____ Number of doors _____ Type of heating _____ # of electrical outlets _____ # of interior partitions _____
4.2	Given the necessary equipment the learner will to 1/4"=1'0" scale draw a one bedroom house floor plan including electrical symbols with 80% accuracy.	4.2	Draw to 1/4"=1'0" scale a one bedroom house floor plan using standard symbols. Include electrical in this drawing.
4.3	Given a typical working drawing of a double garage floor plan, with 1/4"=1'0" scale, the student will figure the number of block it will take to construct this building with 90% accuracy.	4.3	Study working drawing assigned and state the number of blocks it takes to construct this garage.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 5.0 ESTIMATING

The masonry student will demonstrate his ability to estimate with 80% accuracy the number of brick and block needed to construct given structures.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		5.0	Estimate the number of common block 8x8x16 needed to build a wall 8' high and 20' long with one 4'x4' windows and one 3'-0"x6'-8" door. Also estimate the number of common brick needed to make the sill for this window.
5.1	When given a diagram of a proposed masonry wall, the student will correctly estimate the number of bricks and blocks in the wall with 80% accuracy.	5.1	Answer the questions below using the diagram in figure A" as reference.  1. How many of the following is required to construct the wall in figure A": a. Concrete blocks 8x8x16 b. Common bricks c. Jumbo bricks d. Norwegian bricks e. Ashlar blocks
5.2	The student will estimate the number of common brick it takes to complete a single garage 17x17'x8' with a 20% tolerance.	5.2	Give the number of bricks it takes to build a garage 17x17'x8'.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 6.0 LAYING CONCRETE BLOCKS

The student will with 75% accuracy demonstrate his skill for laying concrete blocks and brick to the line as evidenced by a given rating scale. Successful completion of each I.P.O. criterion measure denotes completion of this terminal objective.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
6.1	The student will construct a concrete block corner 6 courses high that is square straight level and plumb with 75% accuracy as evidenced by a given rating scale.	6.1	Build a corner 6 courses high with concrete blocks. Rating scale attached.
6.2	The student will build a concrete block wall 12' long and 8' high level and plumb with 75% accuracy as evidenced by attached rating scale.	6.2	Lay a concrete block wall 12' long and 8' high. Rating scale attached.
6.3	The student will lay 5 courses of concrete blocks to the line with 75% accuracy as evidenced by attached rating scale.	6.3	Lay 5 courses of concrete blocks to the line. Rating scale attached.
6.4	The student will construct a square straight level and plumb, brick corner 12 courses high with 75% accuracy, as determined with the use of a given rating scale.	6.4	Build a brick corner 12 courses high square straight level and plumb. Rating scale attached.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 7.0 FINISHING CONCRETE

Upon completion of this unit, the learner will with 75% accuracy, as evidenced by a teacher rating scale, demonstrate the skill necessary to estimate, pour, and finish a given concrete slab, selecting and using the hand tools correctly.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		7.0	Estimate, mix, pour and finish a slab of concrete 5'x5'x4". Select your own hand tools for the job. You will be graded as follows: RATING SCALE 1. Safety 10 2. Workmanship 10 3. Level 10 4. Forming 10 5. Grading out 10 6. Grade pegs 10 7. Straight 10 8. Jitterbugging 10 9. Pouring 10 10. Finishing 10 100
7.1	Given a concrete computer the learner will estimate the amount of concrete needed to pour a pad 20'x20'x4" with 100% accuracy.	7.1	Take a concrete computer and give the number of yards it takes to pour a pad of 20'x20'x4".

COURSE MASONRY (INTERMEDAITE)

TERMINAL PERFORMANCE OBJECTIVE NO. 7.0 (cont'd) FINISHING CONCRETE

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
7.2	The student will identify 5 steps in preparation for pouring concrete with 85% accuracy.	7.2	From the list below identify 5 steps taken prior to pouring concrete. 1. Digging a ditch 2. Grade stakes 3. Rubbing a wall 4. Wooden forms 5. Mesh wire 6. Reinforcing steel 7. Wet concrete 8. Finishing concrete 9. Screed 10. Patch
7.3	The student will list 7 different structures or items that were built with concrete.	7.3	List 7 structures that were built with concrete.

COURSE Masonry (Intermediate)

TERMINAL PERFORMANCE
OBJECTIVE NO. 8.0 Laying Glass Block

The student will determine the number of glass blocks it takes to fill in a 4' x 4' opening and demonstrate his skill at laying them in the opening with a score of 75% or better as evidenced by a given rating scale. Successful completion of each I.P.O. criterion measure denotes completion of this terminal objective.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
8.1	Given a 4' x 4' opening the student will estimate the number of 4" x 8" x 8" glass blocks necessary to fill in with 10% tolerance.	8.1	Estimate the number of glass block it takes to fill the 4' x 4' opening.
8.2	The student will demonstrate his skill at laying glass block by filling an opening 4' x 4' with 4" x 8" x 8" glass blocks with 75% accuracy or better as evidenced by attached rating scale.	8.2	Lay glass blocks in a 4' x 4' opening. Rating Scale 1. Safety - - - - - - - - - - - - - - - - 10 2. Planning - - - - - - - - - - - - - - - 10 3. Workmanship- - - - - - - - - - - - - 10 4. Layout - - - - - - - - - - - - - - - - 10 5. Spreading Mortar - - - - - - - - - - 10 6. Laying Glass blocks - - - - - - - - 10 7. Use of tools - - - - - - - - - - - - 10 8. Completness of job - - - - - - - - - 10 9. Clean and Replace tools - - - - - - 10 10. Clean up working area- - - - - - - 10

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 9.0 MODULAR DIMENSION

The student will demonstrate his knowledge of modular dimensions by constructing a concrete block wall leaving a modular dimension opening for a window.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		9.0	Build a concrete block wall 6' high and 6' feet long leaving for a given modular measured window.
9.1	The student will name 2 standard dimensions of windows used in modular masonry construction.	9.1	Name 2 dimensions of windows used in modular construction.
9.2	The student will with 80% accuracy answer 5 questions on modular dimensions.	9.2	Answer the following questions: 1. Modular dimensions are measured in fractions and whole numbers (true or false). 2. Write the definition of modular dimension. 3. Modular measurement is not used when veneering a house (true or false). 4. What are the measurements of a standard modular brick? 5. A 4"x8"x12" jumbo brick is in modular dimensions (true or false).
9.3	The student will take a modular ruler and demonstrate its use with 100% accuracy.	9.3	Take modular ruler and demonstrate its use.

COURSE: MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 — STORY POLE AND GAGE STICK

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		10.0	Layout and mark a story pole and gage stick. (Rating scale attached). RATING SCALE 1. Proper length 2. Proper thickness 3. Proper width 4. Proper markings for brick and block 5. Windows height 6. Door sill markings 7. Doors 8. Window sills
10.1	The student will demonstrate the use of the story pole and gage stick with 100% accuracy.	10.1	Demonstrate the story pole and gage stick.
10.2	Given a piece of wood stock 3/4" square and 4' in length the student will construct a gage stick with no errors.	10.2	Construct a gage stick with the stock assigned you.

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 11.0

STRUCTURAL BONDS

After finishing this unit the students will layout and construct a brick wall utilizing all three types of structural bonding with 90% accuracy.

(Rating Scale Attached)

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		11.0	Layout and build a wall 4' x 3' showing all three structural bonds.
11.1	The student will correctly describe in writing the 3 bonds used in structural bonding.	11.1	Describe the 3 structural bonds used in construction: 1. _____ 2. _____ 3. _____
11.2	Given the proper materials the student will layout 3 types of structural bonds with 90% accuracy.	11.2	Layout 3 structural bonds.
11.3	Chose the proper tools and materials and the student will build a wall showing one of the 3 bonds in structural bonding with 90% accuracy.	11.3	Build a wall 4' x 3' showing one of the three structural bonds. (Rating Scale Attached)
11.4	Given enough brick the student will build a wall showing 2 of the 3 structural bonds.	11.4	Construct a wall 4' x 3' showing 2 of the 3 structural bonds. RATING SCALE 1. Safety 10 2. Workmanship 10 3. Level 15 4. Plumb 15 5. Straight 15 6. To the line 15 7. Knowledge of assignment 10 8. Attitude toward assignment 10

RATING SCALE

1.	Safety	10
2.	Workmanship	10
3.	Level	15
4.	Plumb	15
5.	Straight	15
6.	To the line	15
7.	Knowledge of assignment	10
8.	Attitude toward assignment	10
		100

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 12.0 ADVANCED BRICK LAYING

After completing the unit on advanced brick laying the student will achieve 75% accuracy, as evidenced by a given rating scale, on the construction of assigned brick laying projects. Successful completion of each I.P.O. criterion measure denotes completion of this terminal objective.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
12.1	The student will with 80% accuracy name 5 types of brick arches.	12.1	Name 5 different types of brick arches.
12.2	Given the proper material and tools the student will build a Jack arch 3' high 3' wide with 75% accuracy as evidenced by attached rating scale.	12.2	Build a Jack arch 3' high 3' wide. (Rating scale attached).
12.3	The student will define 3 of 4 different types of given fire places with 75% accuracy.	12.3	Define the fire places listed: 1. Single face 2. Two face (adjacent) 3. Two face (opposite) 4. Tall face
12.4	The student will select tools and materials and will construct a fire place with a 3' damper with 75% accuracy as evidenced by attached rating scale.	12.4	Build a fire place with a 3' damper. (Rating scale attached).
12.5	Given a set of drawings on a bar-b-q-pit the student will select tools and materials and construct the project to 75% or better accuracy as measured by attached rating scale.	12.5	Construct bar-b-q-pit to assigned specifications. RATING SCALE 1. Safety 10 2. Workmanship 10 3. Level 15 4. Plumb 15 5. Straight 15 6. To the line 15 7. Knowledge of assignment 10 8. Attitude toward assignment 10

COURSE MASONRY (INTERMEDIATE)

TERMINAL PERFORMANCE OBJECTIVE NO. 13.0 EXPANSION JOINTS

After completing the unit on expansion joints the student will demonstrate his skill and knowledge of expansion joints, by constructing a sidewalk containing expansion joints to given specifications with 90% accuracy.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		13.0	Construct a sidewalk 4' x 20" x 4" with 2 false joints and 2 expansion joints.
13.1	The student will list 3 ways in which the expansion joint is used with 100% accuracy.	13.1	List 3 ways in which the expansion joint is used.
13.2	Given a complete statement concerning expansion joints the student will correctly fill in 4 of the 5 blanks.	13.2	Fill in the blanks in the following statements: All materials expand and become larger if the temperature _____, and _____ if the temperature _____. A brick wall, 100' long if unrestrained will _____ in length approximately _____ when its temperature is increased to 100 degrees fahrenheit.